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症 例 報 告

METASTATIC TUMORS OF THE CRANIAL BASIS

by

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In four cases of metastatic tumor of the cranial basis, I have studied histologically the mode of growth of the tumor within the bone in the decalcified preparations made by the lowered-pressure-warming method.

CASE No. 1 : U. M., male, 34 years old.

Diagnosis at the time of admission : metastasis of the mixed tumor of the right parotid gland to the lung and the invasion of the tumor into the intracranial cavity. About ten years before, a tumor of the size of the tip of the little finger was found in the right parotid region and gradually increased in size. About a year before, the tumor was extirpated at our clinic. Histological diagnosis was a mixed tumor. Seven months later, difficulty of breathing at work, diplopia and numbness of the right half of the face occurred successively. There were cough and stiffness of shoulders. Neurological examination showed the incomplete paralyses of I, III, VI, VII and VIIIth cranial nerves on the right side. In the ventriculogram with iodized oil the right temporal horn was seen to be pushed upward. The patient died three and a half months after admission.

Autopsy findings : The invasive tumors in the cranial basis consisted of extra- and intradural portions; an intradural nodule at the edge of the right sphenoidal wing, an extradural tumor on the right side of the sella turcica, an extradural tumor at the right trigeminal root, and a tumor extending both extra- and intradurally at the root of the left abducens.

Histological findings :

1. The intradural tumor at the right sphenoidal ridge.

The finding in this tumor suggests that neoplastic cells, which have come into the bone marrow (diploe), destruct the diploic bone cellulae and then proceed inward along Rr. perforantes to reach the extradural space. The border between the invaded and the intact part is considerably sharp, and an increase of fibrous tissue is scarcely noticed. In the osseous substance which is being absorbed, there is a bleeding zone. The dura neighboring the tumor is hypertrophic, and invaded by neoplastic cells.

2. The intradural tumor at the root of the left abducens.

Though it may appear at first sight that an intraosseous invasive tumor has

penetrated the dura and proliferated intradurally, it has become evident on close examination that the bone is rather intact, and a thin layer of dural tissue is to be seen between the bone and the tumor tissue. Therefore the tumor may originally be the intralamellar metastasis within the dura which then has grown dissecting dural lamellae. The defect of the inner layer of the dura, through which the tumor has penetrated inward, is relatively small, thus the tumor showing an hourglass form.

CASE NO. 2 : K. N., female, 38 years old.

Diagnosis at the time of admission : metastatic intracranial tumor. Two years before, an indolent tumor was found in the left inguinal region which has since then enlarged to the size of a hen's egg. Half a year later she noticed disturbance of hearing, tinnitus, headache and stiffness of the nuchal region. Hypaesthesia of the face, difficulties of swallowing and expectoration and dysarthria have been present for these two months. Neurological findings are as follows.

The Vth nerve : hypaesthesia of the face, especially on the right half. The disappearance of the corneal reflex on that side.

The VIIth nerve : The taste on both sides of the tongue, especially on the left is affected.

The VIIIth nerve : The disturbance of hearing on both sides, especially on the left.

The IXth nerve : Affected on both sides, especially on the right, and the patient is suffering from the difficulties of swallowing and expectoration.

The Xth nerve : Affected on both sides, especially on the right.

The XIIth nerve : Affected especially on the right.

Since the histological examination of the inguinal tumor revealed reticulosarcoma, the diagnosis of the metastasis of reticulosarcoma to the cranial basis seemed probable. The patient improved remarkably as the result of the X-ray therapy of 4 months' duration, and was discharged. Before long, metastasis occurred in various parts of the body, and the patient was readmitted and then died.

Autopsy findings : In the region of clivus outside the dura, there are slight swellings which are to be noticed only by a very careful observation. The inner 2/3 of the cut dimension of the osseous substance of the cranial base is completely destroyed, brittle, light green, and easily cut with a knife. These changes extend from the dorsum sellae to the major occipital foramen and upward to the internal lamina of the cranial vault.

Histological findings : No large tumor mass is noticed. The dura is almost intact. But both the osseous substance and the medulla are extensively fibrosed. On the left side of the dorsum sellae there is a collection of neoplastic cells whose center has undergone necrosis and softening. The osseous substance remaining dispersedly in this region is being absorbed. The border between the intact and the neoplastic part is not so sharp. The tendency of fibrosis is stronger in the bone marrow than in the osseous substances. The tumor seems to be reticulosarcoma, but not typical, probably due to the X-ray therapy.

CASE NO. 3 : S. O., female, 28 years old.

One year before, the patient underwent extirpation of pelvic sarcoma. Half a year later, the patient got diplopia and pains on the back, breast and nuchal region. Before long. tumors appeared in various parts of the chest, which were aching and tender. Also painful left exophthalmos occurred. Severe headache and vomiting since one week ago.

On examination, conspicuous malnutrition and anaemia are noticed. There is the left exophthalmos with almost complete ophthalmoplegia on the left side. The left eye sees only hand movements just in front. A dolent and elastic hard tumor, rough-surfaced, sharply limited and of the size of a hen's egg is present riding on the left eye ball and covered by the upper eye lid. Similar tumors are noticed in the right temporo-frontal region, on the spinal process of the third cervical vertebra, at the lower end of sternum, on the 8th and 9th right ribs and on the 9th left rib in the mammillary line, and also on the symphysis.

Neurologic findings.: Nothing particular except for the changes of the left eye. In the plain roentogenograms of the skull, the destruction of the frontal and the occipital bone is seen. There is also a tumor shadow at the pulmonary hilus.

Autopsy findings : The internal surface of the cranial bones is eroded widely, especially along the grooves of the middle meningeal artery and of the superior sagittal sinus. In the cranial basis there is no change other than the swelling of the upper wall of the left orbit, which has become very thin as the result of the compression by the intraorbital tumor. Also the supraorbital portion of the frontal bone is eroded by a tumor extension of the size of a small hen's egg. In the sagittal section one can see the invasion of the intraorbital tumor into the frontal sinus. Another tumor is noticed at the dorsum sellae, which is destructed by the tumor invasion. A conspicuous destruction of bone is seen around the internal occipital protuberance, where still another tumor mass is present. All these tumors are histologically round cell sarcoma.

Histological findings : The entire bone marrow is filled with neoplastic cells and in part fibrotic. Masses of neoplastic cells are found also in the osseous substance, which is destructed and absorbed in all directions. The mucous membrane lining the sphenoidal sinus is thickened, filling the sinus, though loose in structure. The tumor tissue seems to be spreading in the space between the sphenoidal bone and the mucous membrane. At some sites, the tumor is seen breaking through the mucosa into the sinus cavity, accompanied by some bleedings.

CASE NO. 4 : M. M., female, 45 years of age.

Diagnosis at the time of admission : *l*-parasellar metastasis of breast cancer. About 10 months before, the patient noticed the difficulty of mastication due to the deficient fixation of the mandible. Later on, she complained of numbness and sometimes burning sensation of the left half of the face. Since 4 months ago she has had diplopia. Later, the left eye ball deviated to the right. Since that time food is spilt from the left angle of the mouth, speach is difficult, tongue is apt to be bitten, and swallowing is hindered.

For the past 5 months her voice has been sniffling, but her nose is not stopped.

In the early stage of the disease the taste is lost in the left half of the tongue, but later over the entire surface of the tongue. From the onset no motor and sensory disturbances in extremities. Neither vomiting nor convulsion has ever occurred. During these two weeks she is apt to stumble on walking. In the past history, she had amputation of the right mamma because of cancer 3 years before, and exstirpation of a recurrent tumor 2 years before.

Neurological findings : (1) Diplopia due to the paralysis of the left abducens, (2) the (peripheral) facial paralysis on the left, (3) the paralysis of the left trigeminus, (4) no choked disc and the normal visual field.

Autopsy : (1) A cancerous plaque of dura on the left side covering the occipital lobe is found looking like the hypertrophy of the dura. (2) A cauliflower like tumor of the size of a hen's egg in the cranial base. The destruction of the basal bone is seen to extend to the sella turcica and dorsum sellae. The 3rd, 4th, 5th, 6th and the 7th cranial nerves on both sides are involved by the tumor, which is reaching the posterior wall of the left orbit. The basal bones are brittle, and the hypophysis is deformed and sloughy.

Histological findings : The tumor seems to have metastatized into the bone marrow at first. The sites of metastasis consist of the mixture of neoplastic cells, fibrous tissue, and a small quantity of the osseous substance under absorption. No trace of bleeding, but there is a feature of yellow marrow. Neoplastic cells are seen not only in the space between the bone and dura, but also within the dura in form of cell clusters, thus causing the remarkable swelling of the dura. The tumor is simple cancer, but in places adenocarcinoma.

Discussions

From the findings in the above four cases, I have had the following impressions.

1. The cranial base, especially the sellar region of the sphenoidal bone seems to be the site of predilection of the metastasis of malignant tumors.

2. The metastasis originates in a certain part of the bone marrow and spreads to the surrounding parts of the marrow, destructing the diploic cellular bone tissue. The bone destruction as the result of the invasion of tumor cells proceeds out- and inward along intraosseous blood vessels and the tumor mass finally appears under the dura.

3. The dura becomes hypertrophic due to the invasion of neoplastic cells, but rarely falls into extensive necrosis. In case of intralamellar metastasis within the dura, the metastatic tumor is seen to grow dissecting dural lamellae and to perforate the inner lamella of the dura through a small hole. Generally the dural may be a banier against tumor invasion. It would not be so easy for a metastatic tumor of the skull to proliferate in ward through the dura to form a large intradural tumor mass.

The Explanation of Photomicrographs

Fig. 1 : Case NO. 1. (a) The extradural portion of the tumor at the right sphenoidal ridge. The tumor growth proceedes inward along Rr. perforantes to reach the extradural space. Hematoxylin and eosin stain (×80).

Fig. 2 : Case NO. 1. (b) The intradural tumor at the root of the left abducens. At the point of penetration of the dura the tumor shows an hour-glass form, the bone beneath being nearly intact. Hematoxylin and eosin stain (×8).

Fig. 3 : Case NO. 1. (c) In the sections neighbouring to Fig. 2, the tumor is seen to proliferate dissecting dural lamellae. Hematoxylin and eosin stain (×80).

Fig. 4 : Case NO. 2. (a) A collection of neoplastic cells on the left side of the dorsum sellae. The central portion undergoes necrosis and softing. Hematoxylin and eosin stain (×40).

Fig. 5 : Case NO. 2. (b)The bone in the region of clivus, the osseous substance remaining dispersedly in this region is being absorbed. Hematoxylin and eosin stain (×80).

Fig. 6 : Case NO. 3. (a)The sagittal cut of the sphenoidal bone, containing the sphenoidal sinus. The bone marrow is filled with neoplastic cells and in part with fibrous tissue. The mucous membrane lining the sphenoidal sinus is thickened. Hematoxylin and eosin stain (×8).

Fig. 7 : Case NO. 3. (b) The sphenoidal bone neighbouring to the dorsum sellae. The masses of neoplastic cells are found both out- and inside the osseous substance, which is being destructed and absorbed in all directions. Hematoxylin and eosin stain (×80).

Fig. 8 : Case NO. 4. The tumor consists of the mixture of neoplastic cells, fibrous tissue, and small quantity of the osseous substance under absorption. Hematoxylin and eosin stain (×80).

All these preparations have been decalcified by 8% trichloroacetic acid for ca. 48 hours, under 1/20 atm. and 30°C.

和 文 抄 録

頭蓋底転移性腫瘍に就て

京都大学医学部外科学教室第1講座（指導：荒木千里教授）

横 田 彰

頭蓋底に転移した悪性腫瘍4例について組織学的に腫瘍の進行状態を検索したが，症例が少いので結論として詳述出来ないが，次の如き傾向を認めた．

1） 頭蓋骨への悪性腫瘍の転移は頭蓋底部，特にトルコ鞍附近に来る事が多い．

2） 転移は先づ骨髄に来て，次第に附近の骨髄に拡り，その間に存する Diploe を吸収し，内板を蚕食して硬膜下に出る．一方動脈の穿通枝にそつて硬膜下に出るものもある．

3） 硬膜は肥厚し，その間に腫瘍細胞の侵入を認めるが，4例中硬膜の破壊された例はなかつた，即ち硬膜は腫瘍の頭蓋腔内への侵入には強い抵抗を示すと思われる．

Fig. 1

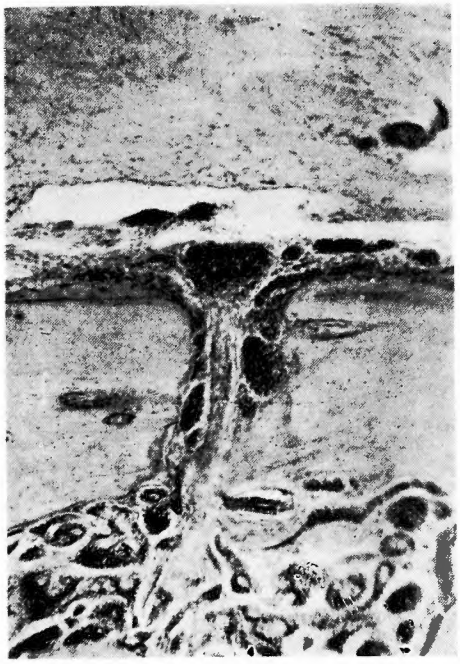

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8